

WHAT IS CLAIMED IS:

1. An endoscope system comprising:  
an endoscope having an elongated insertion unit whose bending section adjoins a distal section thereof;  
an insertion unit guide member including a plurality of tubular members each of which has a guide channel that has a predetermined diameter permitting other tubular member or the insertion unit to smoothly pass through the guide channel, and at least one of which has predetermined degrees of flexibility and predetermined lengths and has a direction changing means for changing the advancing direction in which the insertion unit is advanced through the guide channel, wherein:

the insertion unit guide member is passed through or placed in a pipe.

2. An endoscope system according to Claim 1, wherein:  
the direction changing means is a distal cover member attached to the distal end of the tubular member;  
the distal cover member has a passing direction changing hole whose opening is formed in the lateral side of the distal cover member; and

the passing direction changing hole changes the passing direction, in which the insertion unit is passed, from the

axial direction of the tubular member to the lateral direction thereof.

3. An endoscope system according to Claim 1, wherein the direction changing means comprises:

a base member located at the distal end of the tubular member; and

an operation wire having the distal end thereof fixed to the base member and having the proximal end thereof extended towards a hand-held portion.

4. An endoscope system according to Claim 2, wherein the distal cover member that is attached to the distal end of the tubular member and that serves as the extremely distal portion of the insertion unit guide member includes a leading direction adjusting means for adjusting the leading direction in which the insertion unit is led out of the passing direction changing hole.

5. An endoscope system according to Claim 4, wherein the leading direction adjusting means comprises:

a raiser located distally to the passing direction changing hole of the distal cover member; and

an operation wire having the distal end thereof fixed to the raiser and having the proximal end thereof extended

towards a hand-held portion.

6. An endoscope system according to Claim 3, wherein:  
the tubular member comprises a tube and a braid that  
sheathes the periphery of the tube; and

the operation wire is interposed between the tube and  
the braid and extended towards the hand-held portion.

7. An endoscope system according to Claim 5, wherein:  
the tubular member comprises a tube and a braid that  
sheathes the periphery of the tube; and

the operation wire is interposed between the tube and  
the braid and extended towards the hand-held portion.

8. An endoscope system according to Claim 1, wherein:  
when a plurality of tubular members is joined, the  
inner and outer diameters of the tubular members are  
determined so that the diameter of the tubular member  
located on the distal end side will be smaller than that of  
the tubular member located on the hand-held portion side;  
and

the lengths of the tubular members are determined so  
that the length of the tubular member located on the distal  
end side will be larger than that of the tubular member  
located on the hand-held portion side; and

the degrees of flexibility of the tubular members are determined so that the tubular member located on the distal end side will be softer than the one located on the hand-held portion side.

9. An endoscope system according to Claim 1, wherein:  
the tubular member comprises a tube and a braid that sheathes the periphery of the tube; and  
a tool tubular member through which a tool can lie is interposed between the tube and the braid.

10. An endoscope system according to Claim 1, wherein:  
a balloon that changes from a contracted state to a dilated state or vice versa is located at the middle of the tubular member; and

when the balloon is dilated, the dilated balloon comes into close contact with the wall of a pipe, and the tubular member is locked at a predetermined position in the pipe.

11. An endoscope system according to Claim 1, wherein when the pipe has a flat shape, the tubular member to be passed through the pipe comprises:

a plurality of juxtaposed tubes; and  
a braid sheathing the juxtaposed tubes.

12. An endoscope system according to Claim 1, further comprising:

a drum about which the insertion unit is wound and which has a controller, which controls the bending section, incorporated in the center of the bore thereof; and

a support for supporting the drum so that the drum can freely rotate.

13. An endoscope system according to Claim 1, wherein:

the endoscope has an elongated insertion unit that includes a distal section in which an observational optical system and an illumination optical system are incorporated, a bending section that adjoins the distal section, and a flexible tube that adjoins the bending section, that has a metallic braid and a tube body integrated thereinto, and that has a smaller outer diameter than the bending section does; and

a guide tube which has a metallic braid and a tube body integrated thereinto and whose outer diameter is substantially identical to the outer diameter of the bending section is mounted on the periphery of the flexible tube included in the insertion unit so that the guide tube can slide freely.

14. An endoscope system according to Claim 13, wherein

the insertion unit includes an attaching/detaching means for attaching the flexible tube to the guide tube so that the flexible tube can be freely detached from the guide tube.

15. An endoscope system according to Claim 14, wherein the attaching/detaching means is an elastic member that comes into close contact with the external surface of a base, which joins the bending section and the flexible tube, with predetermined holding force.

16. An endoscope system according to Claim 13, wherein a plurality of bosses whose distal portions are shaped substantially like a sphere is formed on the external surface of the tube body included in each of the guide tube and flexible tube.

17. An endoscope system comprising:

an endoscope having an insertion unit that is elongated and that includes a distal section in which an observational optical system and an illumination optical system are incorporated, a bending section that adjoins the distal section, and a flexible tube that adjoins the bending section, that has a metallic braid and a tube body integrated thereinto, and that has a smaller outer diameter than the bending section does; and

a guide tube being mounted on the periphery of the flexible tube so that it can slide freely, having a metallic braid and a tube body integrated thereinto, and having substantially the same outer diameter as the bending section does.

18. An endoscope system according to Claim 17, wherein the insertion unit includes an attaching/detaching means for attaching the flexible tube to the guide tube so that the flexible tube can be freely detached from the guide tube.

19. An endoscope system according to Claim 18, wherein the attaching/detaching means is an elastic member that comes into close contact with the external surface of a base, which joins the bending section and the flexible tube, with predetermined holding force.

20. An endoscope system according to Claim 17, wherein a plurality of bosses whose distal portions are shaped substantially like a sphere is formed on the external surface of the tube body included in each of the guide tube and flexible tube.

21. An endoscope system according to Claim 17, wherein when each of the guide tube and flexible tube is formed with

a plurality of tubes, adjoining ones of the tubes are joined using a pipe fitting in order to attain a predetermined length.

22. An endoscope system according to Claim 17, wherein: when the guide tube is formed with a plurality of tubes having different diameters so that it will have a predetermined length, the ends of the tubes having different diameters are layered and joined so that the diameter of the guide tube will diminish from the proximal end thereof to the distal end thereof.

23. An endoscope system according to Claim 17, wherein: when the guide tube is formed with a plurality of tubes having different diameters and different lengths so that it will have a predetermined length, the proximal ends of the tubes are located at the same position so that the diameter of the guide tube will diminish from the proximal end thereof to the distal end thereof.

24. An endoscope system according to Claim 17, wherein:

the insertion unit comprises a soft bending section, a braid tube that is harder than the bending section to a predetermined extent, and a coiled tube that is harder than



the braid tube to a predetermined extent; and

the bending section, braid tube, and coiled tube are joined in that order from the distal end of the insertion unit.

25. An endoscope system according to Claim 17, wherein the bending section is formed with a fluid pressure actuator.

26. An endoscope system according to Claim 25, wherein: when fluid compartments formed in a multi-lumen tube included in the fluid pressure actuator are connected to insertion unit-side tubes with stepped communication members between them, a stepwise portion is formed at the end of the multi-lumen tube in order to prevent interference among the stepped communication members that communicate with the fluid compartments.

27. An endoscope system according to Claim 25, wherein: when the insertion unit-side tubes are connected to the fluid compartments formed in the multi-lumen tube included in the fluid pressure actuator, the ends of the insertion unit-side tubes to be inserted into the fluid compartments are tapered.

28. An endoscope system according to Claim 25, further

comprising:

a drum about which the insertion unit of the endoscope is wound, and which has a fluid pressure source that supplies a fluid to the fluid pressure actuator, and a supply-of-fluid control unit, which controls the supply of fluid from the fluid pressure source, incorporated substantially in the center thereof; and

a support for holding the drum so that the drum can rotate freely.